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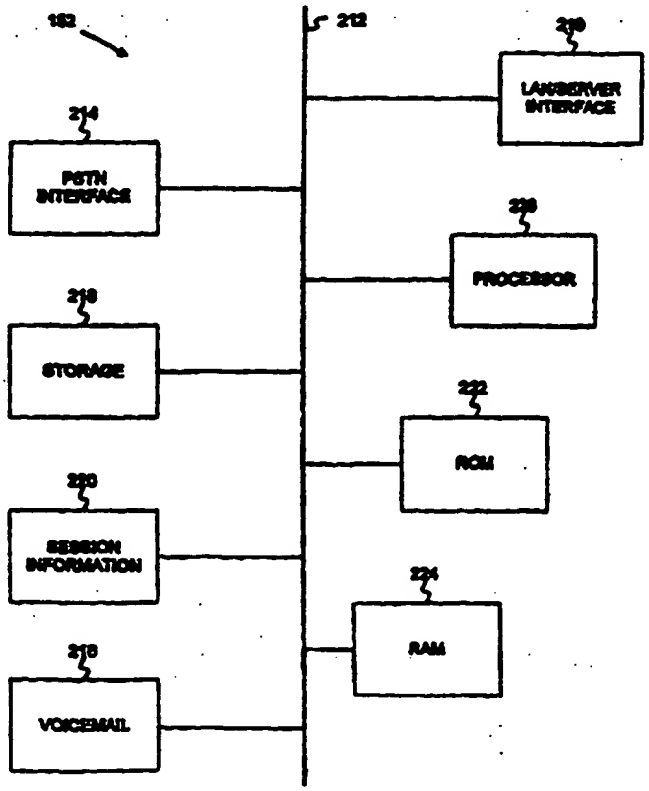
(57) Abstract

A system and method complete a telephone call connection using an in-progress Internet connection. A user conducting the Internet session is notified of incoming calls, and may make outgoing calls. A voice gateway at the Internet Service Provider (ISP) handles transfer of telephone call information between a public switched telephone system (PSTN) and an ISP-access connection established by the ISP. In this way, voice is transmitted over the relatively real-time connection between the ISP and the user. Calls to the user are first attempted to be routed to the user, but when the user line is found to be busy, the call is forwarded to the voice gateway. The voice gateway receives the forwarded call, and determines whether the line associated with the forwarded call is conducting an Internet session. If such a connection is established, the voice gateway sends a notification over the Internet connection to the user. The user can then decide how to dispose of the call. If the user decides to take the call, voice information continues to be transferred between the user and the person making the call on the PSTN, using the ISP-access connection.



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CALL MANAGEMENT APPARATUS AND METHODS FOR HANDLING CALLS DURING AN INTERNET SESSION

BACKGROUND OF THE INVENTION

The present invention relates generally to the transmission of voice communications during an Internet session, and specifically to the simultaneous handling of telephone calls and data over a telephone line being used for an Internet session without conventional transmission delays.

The Internet has created many new opportunities for ways to communicate information. The wealth of information available through the Internet to any individual with minimal computer hardware has vastly spread the popularity of the Internet. A typical user of the Internet is a person at home or in a small business who accesses the Internet via an Internet Service Provider (ISP) using his or her desktop computer, a modem, and the home telephone line. The ISP interfaces with the user via a central office of the telephone switching network and serves as a gateway for accessing information distributed across the Internet for the user.

Most homes and many small businesses have only a single telephone line, which limits voice and data accessibility. When an Internet session is active from the home or small business, incoming telephone

calls are typically blocked, and the caller receives a busy signal. Unless the Internet subscriber also has a voicemail system, the incoming call is lost. Call waiting provides a solution to an active telephone line when the line is occupied with a voice transmission. A sound on the telephone line alerts the user that an incoming call is present, and the user can elect to either switch to or disregard the incoming call. Unfortunately, call waiting is not compatible with modem communications. Generally, call waiting for voice communications is disabled when the telephone line is used for data link sessions such as connection to the Internet.

One solution to the limitations of extended Internet sessions is the addition of second telephone line or ISDN line to the home or small business. Use of the Internet alone, however, is generally not enough to justify these costs for a family or small business.

Voice connections over the Internet are known. These techniques have typically arisen to take advantage of the low cost of connect time to the Internet, which avoids the long distance telephone network. The users desiring to have a conversation, however, must both be connected to the Internet, and have compatible voice-over-the-Internet (VOI) software packages. VOI software packages act as a client for transmitting and receiving call data in packets using an Internet protocol. Examples of VOI software include Intel's H.323 Internet Phone Product, Netmeeting from Microsoft, and Webphone. These software packages allow users to have conversations via Internet connections, without incurring the typical costs of a long distance telephone call. Unfortunately, conventional VOI software packages do not address the handling of incoming telephone calls through the PSTN while the telephone line is occupied with a link to the Internet.

The Internet also presents several problems for such systems. The most difficult problem for VOI systems is delay of transmission inherent to the operation of the Internet. The large number of routers and networks tied together in the Internet creates many of these unavoidable delays. In order to compensate for the delays of the Internet, typical VOI software buffers incoming data in order to remove the delays and present the incoming voice data stream. Even though some of the delays may be removed, it is not possible to remove all of the delays created by the Internet.

In light of the foregoing, a need exists for a technique for receiving incoming telephone calls from the PSTN while the called telephone line is occupied with a data connection to the Internet. A need also exists for a technique to make voice communications over a single telephone line while being connected to the Internet without the cumbersome delays and setup arrangements of the current systems.

SUMMARY OF THE INVENTION

Accordingly, the present invention is directed to a method and apparatus for providing telephone communication over an active data connection that substantially obviates one or more of the limitations and disadvantages of the described prior arrangements.

Additional objects and advantages of the invention will be set forth in part in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention will be realized and attained by means of the elements and combinations particularly pointed out in the appended claims.

To achieve these and other objects and advantages, and in accordance with the purpose of the invention as embodied and broadly

described herein, a method consistent with the present invention includes steps for providing a telephone communication over an active data connection between a user and a data service provider. This method generally comprises the steps of receiving from a telephone network a forwarded telephone call for the user; determining that a line associated with the forwarded telephone call and the user is carrying an active data connection directly with the data service provider; and sending to the user a notification of the forwarded telephone call over the line via the active data connection.

In another aspect, a method consistent with the present invention provides a telephone communication by a data service provider over an active dial-up data connection between a user of a computer and a destination. This method comprises the steps of receiving a destination number from the computer via the active dial-up data connection between the computer and the data service provider; placing a call to the destination number via a public switched telephone network; and coordinating, upon connection of the call, the telephone communication between the computer and the destination along a path directly across the public switched telephone network and the active dial-up data connection.

In another aspect, an apparatus consistent with the present invention provides data service access to a computer and transmits a telephone communication over an active data connection established between the computer and the a data service provider. This apparatus generally comprises a modem coupled to the computer via a central office (CO) telephone switch for maintaining the active data connection, the CO telephone switch being coupled to a public switched telephone network (PSTN); a voice gateway coupled to the PSTN for transmitting a telephone call between a caller tied to the PSTN and the modem; and a server

coupled to the voice gateway, the modem, and the data service, for communicating data between the data service and the modem to connect the data service and the computer.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the invention, as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the description, serve to explain the principles of the invention.

FIG. 1 is a block diagram showing a system in which a preferred embodiment of the present invention may be implemented;

FIG. 2 shows a preferred embodiment of a voice gateway consistent with the present invention;

FIG. 3 is a flowchart showing how the voice gateway processes an incoming call in accordance with a preferred embodiment of the present invention;

FIG. 4 is a flowchart showing call handling software processing in accordance with a preferred embodiment of the present invention;

FIG. 5 is a block diagram illustrating a pop-up window notifying a user of an incoming call;

FIG. 6 is a flowchart showing how call handling software in a desktop computer initiates a call consistent with a preferred embodiment of the present invention; and

FIG. 7 is a flowchart showing a process performed at the voice gateway for an outgoing call.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference will now be made in detail to the present preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

The present invention allows a user to place and receive telephone calls via an active data connection with a data service, such as an Internet connection. More particularly, the present invention transfers call data in packets over a data service connection established between a user and the ISP. The ISP is connected to a public switched telephone network (PSTN) via a voice gateway. The voice gateway acts as a conduit between a telephone 128 (called or calling) on the PSTN and the user, via the dial-up or ISP-access connection between the user and the ISP. During an Internet session, the telephone connection between the desktop computer of the user and the ISP is very stable. That is, with respect to information being transferred between the desktop computer and the ISP, varying time delays are minimal. Connections between the ISP and entities on the Internet, on the other hand, are subject to random delays caused by the vast expanse of the Internet routing system. The present invention takes advantage of the user-to-ISP connection to receive and transmit voice data over the connection. This technique allows a user with a single telephone line to send and receive calls while he or she is in session on the Internet.

FIG. 1 is a block diagram showing a system in which a preferred embodiment of the present invention may be implemented. The system is comprised of a user site 104 that includes a computer 102, such as a standard desktop or laptop personal computer, a modem 112, and a telephone 108. Modem 112 may be any type of device for connecting computer 102 with external resources using a telephone line, such as a

Hayes-compatible modem internal or external to the computer or like device. Headset 106 may be used to handle telephone calls from desktop computer 102 and modem 112.

Both modem 112 and telephone 108 are connected to a central office telephone switch 116 via standard telephone lines and equipment. Central office 116 may direct calls from user site 104 to another call receiving switch, such as central office 120 or PSTN 124, in a conventional manner. In an embodiment consistent with the present invention, a single telephone line connects both modem 112 and telephone 108 within user site 104 to central office 116. Consequently, only one of modem 112 and telephone 108 could conventionally be used at once. That is, if a person was using telephone 108, the single telephone line connecting user site 104 with central office 116 would be occupied with a voice connection, and modem 112 could not simultaneously access the single telephone line. Conversely, if modem 112 was using the telephone line in a data connection, such as during a session on the Internet or similar computer network, a person could not simultaneously use telephone 108 to make or use a call.

Central office 120 or 116 may also connect calls to a data service provider, such as Internet Service Provider (ISP) 132. ISP 132 connects the user to a data service, such as the Internet 156, and generally comprises a group of modems 136, a voice gateway 152, a local area network (LAN) 140, and a server 144. Modems 136 connect ISP 132 with modems within user sites, such as user site 104, via central office 116 and 120. ISP typically provides access to the Internet for a number of users or subscribers, and the number of modems 136 may vary depending on the number of the clientele serviced by ISP 132. For purposes of illustration and not limitation, FIG. 1 shows only a single user

site 104.

Server 144 within ISP 132 functions as a gateway to the Internet 156, or other data service, and a storage location of operating software for ISP 132. As a gateway to the Internet 156, server 144 helps provide translation and interpretation of data that is communicated between ISP 132 and the Internet, and may perform other tasks like overseeing security to ISP user accounts, managing the status of the ISP user accounts, and providing a firewall. Also, server 144 may help to coordinate communication within ISP 132, such as between modems 136 and voice gateway 152. Server 144 may be a UNIX workstation or similar device like an IBM-PC based computer, although its size and capabilities are not restrictive on the performance of the present invention.

Voice gateway 152 functions as an interface between ISP 132 and the PSTN 124. In this way, voice gateway 152 helps to translate voice messages received from the PSTN 124 into a protocol that ISP 132 can understand, and vice versa. LAN 140 serves as a communication medium for information exchanged between modems 136, server 144, and voice gateway 152.

The Internet 156, as is readily known, comprises a large series of computer networks coupled together through routers. Computer users may access information within the computer networks of the Internet 156 either through a direct connection to a network or through a service provider such as ISP 132. As shown in FIG. 1, other user sites, such as user site 164, may also access the Internet 156 via other servers or service providers, such as server 160. User site 164 may include a computer 168 with headset 170, modem 172, and telephone 176 as shown.

A preferred embodiment of the present invention comprises user site 104, central office 116 and possibly 120, PSTN 124, caller telephone 128, ISP 132, the Internet 156 and the implementation of requisite software. Specifically, two primary components of this embodiment are "call handling" software on a user's computer, such as desktop computer 102, and voice gateway 152 within ISP 132. The call handling software acts as a client to voice gateway 152. In particular, the call handling software in desktop computer 102 exchanges call data packets with voice gateway 152. Call data packets include whatever packets are necessary to set up a call, transfer voice data while the call is in progress, and tear down the call. The general protocol for call handling packets is understood in the art.

The call handling software of desktop computer 102 transmits and receives call data via modem 112. In a preferred embodiment, the call handling software transmits call data in packets via an Internet connection in progress. The call handling software operates to transmit and receive call data packets between desktop computer 102 and ISP 132 using an Internet protocol. The call handling software may, for example, be in the form of a Java applet. Session software operates in a manner similar to the VOI software described above. Headset 106 is used to conduct telephone conversations. In a preferred embodiment, the call handling software package implements ITU H.323 standard for audioconferencing. VOI software packages and the H.323 standard are well understood in the art and will not be discussed in detail herein.

FIG. 2 shows a block diagram of preferred embodiment of voice gateway 152. Voice gateway 152 may be implemented, for example, using a server architecture and may comprise a high-end personal computer or workstation with Windows NT operating system. Voice

gateway 152 interfaces with PSTN 124 via PSTN interface 214 and interfaces with LAN 140 via LAN/server interface 210. Voice gateway 152 includes typical computer architecture elements, such as processor 228, storage 218, ROM 222, and RAM 224. Finally, voice gateway 152, in a preferred embodiment, also stores session information 220 and voicemail 216.

Voice gateway 152 sets up an incoming or outgoing call connections between a user's call handling software and the telephone system while the user is connected to the Internet via ISP 132. Voice gateway 152 may advantageously be located in either the telephone system or at the ISP. In a preferred embodiment of the invention, voice gateway 152 is located at ISP 132.

A telephone call originating from PSTN 124 intended for user site 104 is routed through central office 116. If the user is logged on to Internet 156, a busy condition is detected by central office 116. In response to the busy condition, central office 116 forwards the call through PSTN 124 to voice gateway 152, using techniques commonly understood in the art. Upon receiving the forwarded call, voice gateway 152 begins processing the telephone call.

FIG. 3 is a flowchart showing how voice gateway 152 processes an incoming call in a preferred embodiment consistent with the present invention. Voice gateway 152 first checks session information 220 to determine whether the user to which the call is directed is on-line (step 310). If the user is determined not to be on-line, this condition indicates that telephone 108 is using the line, or that some device at user site 104 is using the telephone line but is not connected to ISP 132. In this case, voice gateway 152 processes the call according to the user's previously set preferences for handling calls when the line is busy, but not being used

for an Internet session (step 322). The user may have specified, for example, that a busy signal should be returned to the caller, or that the incoming call should be forwarded to voicemail or a different extension.

On the other hand, if session information 220 indicates that the user associated with the incoming call is on-line with ISP 132, then voice gateway 152 begins setting up a call connection with the call handling software of desktop computer 102. Voice gateway 152 first sends one or more packets to call handling software within desktop computer 102 via modems 136 and central offices 116 and 120 to indicate that an incoming call has been received. This process initiates user notification of the incoming call on desktop computer 102 (step 314). The indication of an incoming call is sent by voice gateway 152 via the ISP-access connection established between ISP 132 and desktop computer 102. This notification may, for example, generate a window on the screen of computer 102 or may present an audible indication to the user to inform the user of the incoming call. The notification serves to alert the user and also to prompt the user for further instructions, if needed, on how to route the incoming call.

The user of computer 102 selects how the incoming call is to be handled, for example, by pressing a selected key or pointing and clicking on an icon in response to the notification generated by the Java applet. In response, the call handling software sends one or more packets to voice gateway 152 indicating how the call is to be handled, such as by routing the call to voicemail. Voice gateway 152 receives the user selection information in one or more packets (step 318) and processes the call in accordance with the user selection (step 322).

FIG. 4 is a flowchart showing call handling software processing according to a preferred embodiment of the present invention. The

software examines incoming call data packets (step 410), and determines whether any of the packets indicate an incoming telephone call (step 414). If there is no incoming call, the call handling software continues examining incoming packets for calls. If an incoming call is detected, the call handling software presents the user with a screen of selections (step 418). These selections may include routing the call to voicemail, receiving the call, returning a busy signal to the caller, and letting the call continue to ring, for example. After the user makes a selection in response to the call options, the call handling software handles the selection accordingly (step 422).

FIG. 5 is a block diagram illustrating an exemplary pop-up window that notifies a user of an incoming call. As discussed previously, the window notifies the user of computer 102 that an incoming telephone call has arrived and provides several options for handling the call. If the caller ID information is available, the caller number and/or name is identified (i.e., "123-456-7890"). In the illustration of FIG. 5, the user is given four options: (1) Receive call; (2) Route call to voicemail; (3) Return busy signal; or (4) Let call ring. Other options will be apparent, such as to forward the call to another extension or to route the call to a cellular phone. In a preferred embodiment, a user selects one of the options with a mouse, and the call handling software detects the selection. Session software for the Internet connection places the selection in one or more data packets and transmits the selection via the Internet connection to voice gateway 152 for processing.

If the user selects "Receive call," voice gateway 152 sets up the connection with call handling software, as is typical with VOI software. Voice gateway 152 begins routing call data packets to call handling software on desktop computer 102 via the existing Internet connection.

Session software then handles the incoming call, as is well understood in the art of VOI data transfer.

If the user selects "Route call to voicemail," voice gateway 152 responds by routing the incoming call to voicemail 216. In a preferred embodiment voice gateway 152 implements voicemail for each user for which the service is provided. Finally, if the user selects "Return busy signal," or "Let call ring," voice gateway 152 responds by returning the selected type of signal to the caller.

This described embodiment of the present invention for receiving telephone calls directly over an established ISP-access connection avoids the detrimental time delays inherent in telephone calls placed through the Internet itself. By routing the call only through the PSTN and the modem-to-modem connection between the ISP and the user's computer, the technique consistent with the present invention uses only paths having small and predictable time delay and results in an improved quality of telephone connection compared with conventional arrangements.

In some situations, a user may want to make a telephone call while being logged on to the Internet in an active data connection. The present invention allows the user to place the call and converse with another person using headset 106. In particular, the user is allowed to place a call over PSTN 124 by using the in-progress ISP-access link established with ISP 132.

FIG. 6 is a flowchart showing how the call handling software of desktop computer 102 initiates a call. A user has indicated using the call handling software that he or she would like to place a call, including the telephone number of the call destination (step 610). This transfer of information may take place using a pop-up window on the screen of computer 102 or some other conventional method for prompting and then

receiving commands from a user. Next, call handling software packetizes a call initiation request with the destination number, and sends the information to voice gateway 152 (step 614) via central office 116, central office 120, modems 136 and LAN 140 (i.e., via the ISP-access connection to the ISP 132). The call handling software then waits to hear the result of the attempted call.

FIG. 7 is a flowchart showing the process performed at the voice gateway 152 for an outgoing call. As mentioned above, voice gateway 152 receives the destination number as part of the call initiation packets received from the call handling software of desktop computer 102 (step 710). Upon receiving the destination information, voice gateway 152 places the call via PSTN 124 (step 714). If it is determined that the line at the called party is not ringing (step 718), an indication of this status is sent to the call handling software (step 722). On the other hand, if the voice gateway 152 determines that the line at the called party is ringing, the call handling software and voice gateway 152 transfer call data packets to conduct the call (step 726).

Referring again to FIGS. 6 and 7, if there is no connection to the destination, meaning that the line is busy or otherwise not accessible, and voice gateway 152 returns such an indication to the call handling software (step 722), the call handling software notifies the user of this status (step 622) if the call handling software determines that a connection was not made (step 618). If, on the other hand, some connection is made, the call handling software and voice gateway 152 transfer call data packets to conduct the call (step 626). The packetizing of call data for establishing a call connection, transferring voice information between the callers, and breaking down the call connection, is well understood in the art and will not be detailed here.

The above-described technique allows a user who is logged on the Internet to place a call via the ISP-access connection and PSTN 124 without the delays typically associated with using the phone through the Internet 156. Moreover, the present invention does not require the person receiving the call to have special software to receive the call, as is typically required in Internet phone implementations.

It will be apparent to those skilled in the art that various modifications and variations can be made in the apparatus and methods described herein without departing from the scope or spirit of the invention. As an example, session software may be implemented using an off-the-shelf VOI client. In this embodiment, voice gateway 152 would communicate with the VOI client using the protocol required by the particular VOI client. Instead of voice gateway 152 receiving the user call handling selections from call handling software, the call handling software could handle the call locally. For example, if the user selects "Send to voicemail," call handling software could connect the call to a local voicemail system implemented on the desktop machine. Implementation of local voicemail systems are well understood in the art. In this embodiment, voice gateway 152 acts merely to set up a call connection with the call handling software of desktop computer 102. In other words, several of the special call handling functions are migrated from voice gateway 152 to call handling software in desktop computer 102.

Voicemail can be implemented virtually anywhere in the system. In addition to implementing voicemail locally on desktop 102, or on voice gateway 152, either of these devices could store voicemail on devices located on PSTN 124 or Internet 156. Voicemail could also be implemented by routing the call to yet another entity on PSTN or Internet which is dedicated to implementing a voicemail system.

Instead of using call forwarding, calls may be directed initially directly to voice gateway 152, which checks to see if the user is currently on-line to the Internet. This embodiment has the advantage of bypassing the initial step of having central office 116 attempt placement of the call, and may be especially useful when user site 104 is typically on-line to the Internet 156.

The system has been shown and described as being implemented over a telephone line, as is typical for most users. The principles described herein, however, could also be used on a high speed line between a user's desktop computer and the ISP.

The above preferred embodiment requires the call handling software to monitor incoming packets to determine if there is an incoming call. This may also be implemented by having the Internet browser look for packets indicating an incoming telephone call, and making a software call to the call handling software to begin handling the call. The particular location of the call handling software could be anywhere that is in communication with the incoming packet stream.

Finally, although the above preferred embodiments have been described in terms of the Internet, the principles described herein could be used with other networks. That is, the principles described herein could be used to handle calls over an in-progress data connection over other types of networks, e.g. a LAN.

Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only, with a true scope and spirit of the invention being indicated by the following claims.

WHAT IS CLAIMED IS:

1. A method of providing a telephone communication over an active data connection between a user and a data service provider, comprising the steps of:

receiving from a telephone network a forwarded telephone call for the user;

determining that a line associated with the forwarded telephone call and the user is carrying an active data connection directly with the data service provider;

sending to the user a notification of the forwarded telephone call over the line via the active data connection;

receiving, from the user over the active data connection, a call disposition request for the forwarded telephone call; and

carrying out the request.

2. The method of claim 1, wherein the step of carrying out the request includes the substep of directing the forwarded telephone call to voicemail.

3. The method of claim 1, wherein the step of carrying out the request includes the substep of transferring the forwarded telephone call to the user over the line using the active data connection.

4 The method of claim 3, wherein the substep of transferring the forwarded telephone call includes the substep of converting packets of the forwarded telephone call to an acceptable protocol for the active data connection.

5. The method of claim 1, wherein the step of carrying out the request includes the substep of returning a busy signal to a source of the forwarded telephone call.

6. The method of claim 1, wherein the step of sending to the user includes the substep of transmitting at least one packet to the user to indicate the reception of the forwarded telephone call.

7. The method of claim 1, wherein the step of sending to the user includes the substep of causing a pop-up window at the user to provide a plurality of call disposition requests.

8. The method of claim 1, further comprising the step of:

establishing a call connection between the user and the forwarded telephone call directly across the active data connection.

9. A method of providing a telephone communication by a data service provider over an active dial-up data connection between a user of a computer and a destination, comprising the steps of:

receiving a destination number from the computer via the active dial-up data connection between the computer and the data service provider;

placing a call to the destination number via a public switched telephone network; and

coordinating the telephone communication between the computer and the destination along a path directly across the public switched telephone network and the active dial-up data connection.

10. The method of claim 9, wherein the step of receiving includes the substep of simultaneously communicating Internet data to the user.

11. The method of claim 9, wherein the step of coordinating includes the substep of simultaneously communicating Internet data to the user.

12. The method of claim 9, wherein the step of coordinating the telephone communication includes the substep of returning a busy signal to the computer upon unavailability of the destination number.

13. The method of claim 9, wherein the step of coordinating the telephone communication includes the substep of transferring call data packets to the computer to establish a link upon connection of the call.

14. An apparatus for providing a data service access to a computer and for transmitting a telephone communication over an active data connection established between the computer and the data service, comprising:

a modem coupled to the computer via a central office (CO) telephone switch for maintaining the active data connection, the CO telephone switch being coupled to a public switched telephone network (PSTN);

a voice gateway coupled to the PSTN for transmitting a telephone call between a caller tied to the PSTN and the modem; and

a server coupled to the voice gateway, the modem, and the data service, for communicating data between the data service and the

modem to connect the data service and the computer.

15. The apparatus of claim 14, wherein the voice gateway transmits a telephone call that was forwarded from the CO telephone switch via the PSTN to the modem.

16. The apparatus of claim 14, wherein the voice gateway transmits a telephone call from the modem to a destination directly via the PSTN.

17. The apparatus of claim 14, wherein the voice gateway includes a processor and RAM.

18. The apparatus of claim 17, wherein the processor manages session information for the telephone call between the caller tied to the PSTN and the computer.

19. The apparatus of claim 14, wherein the voice gateway includes storage for voicemail and directs the telephone call to the voicemail.

20. The apparatus of claim 14, wherein the voice gateway is a UNIX workstation.

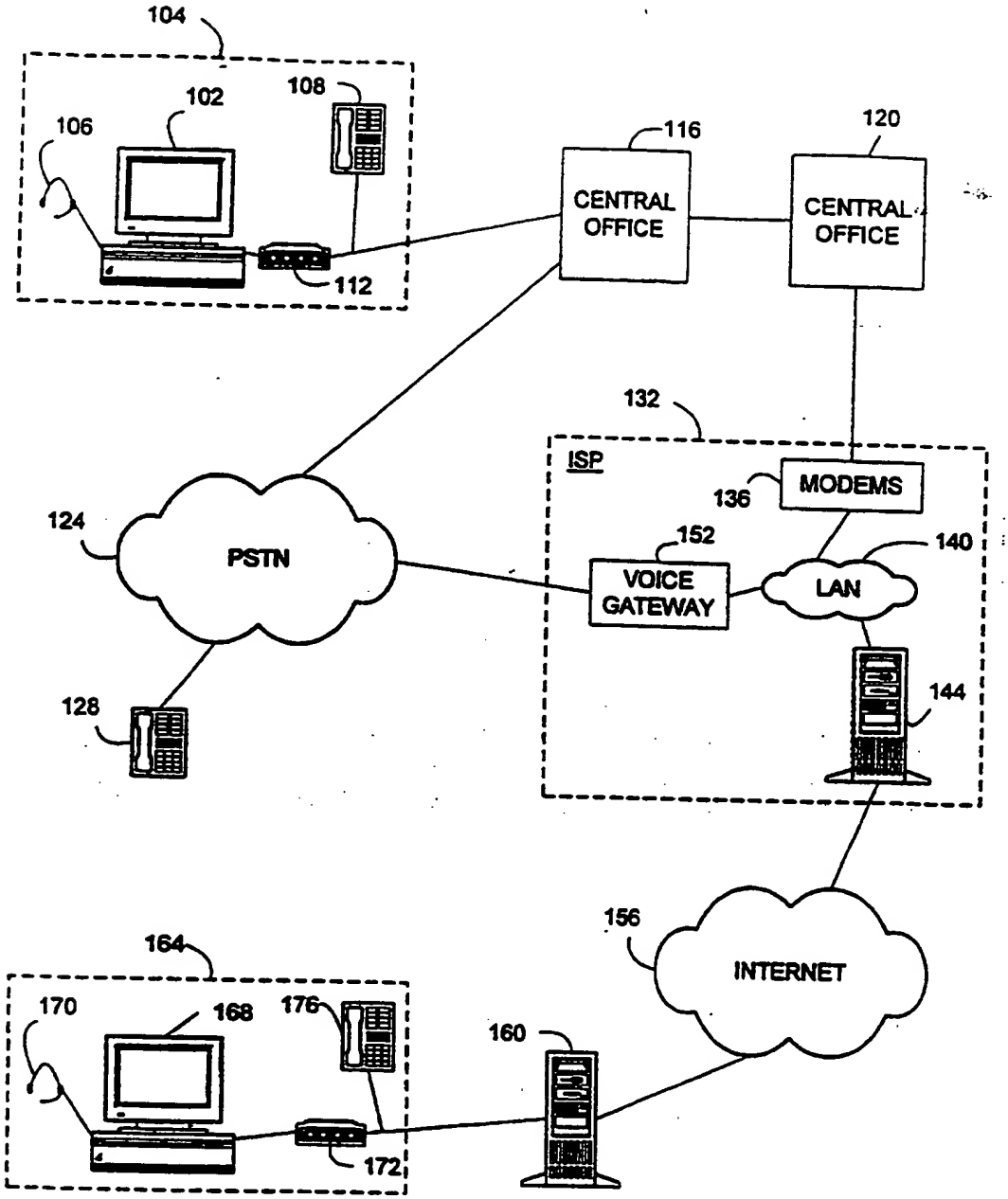
104
102
108
106
116
120
CENTRAL OFFICE
CENTRAL OFFICE
112
132
ISP
MODEMS
136
124
PSTN
152
140
VOICE GATEWAY
LAN
144
128
156
INTERNET
164
170
168
176
160
172

FIG. 1

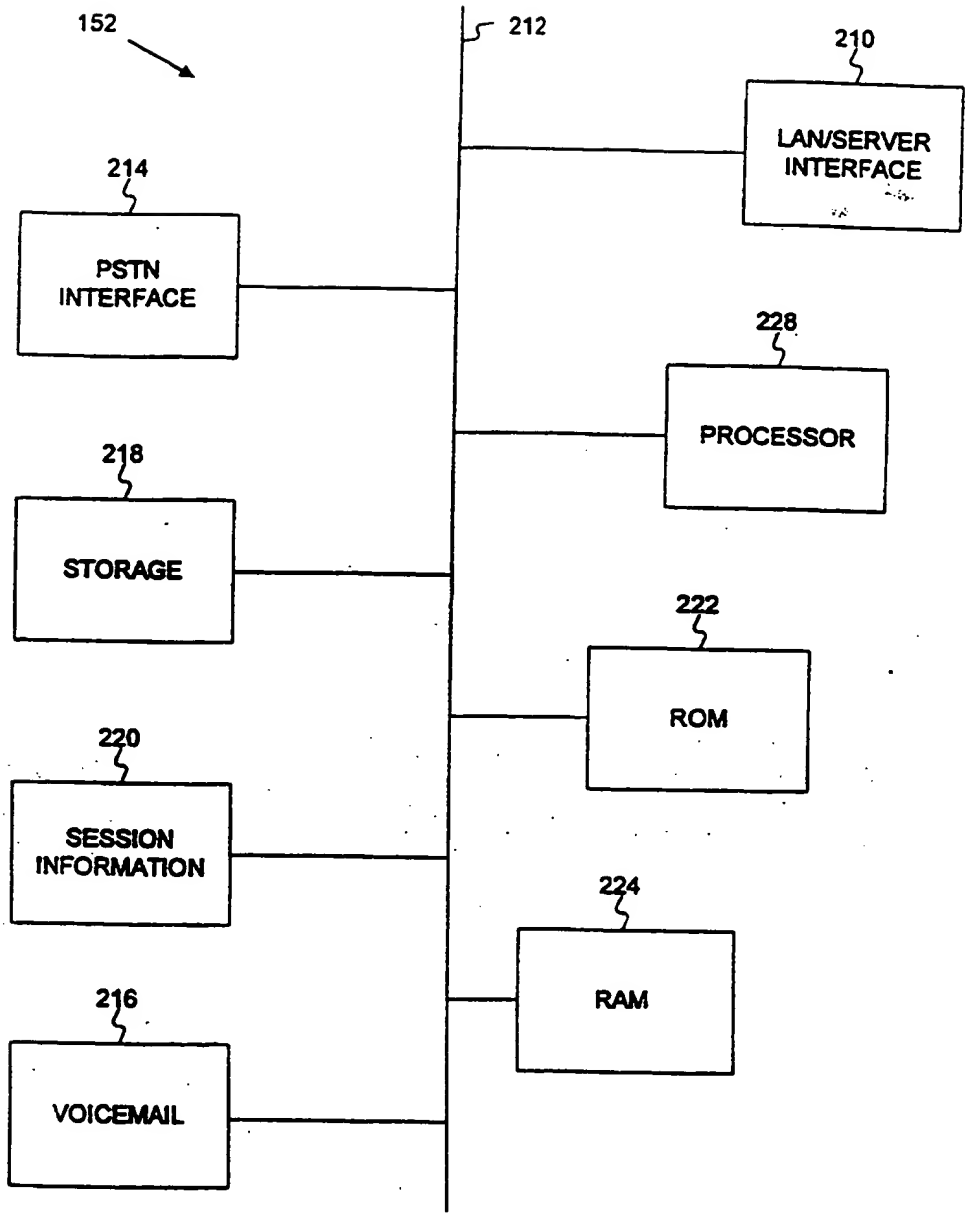
152
212
210
LAN/SERVER INTERFACE
214
PSTN INTERFACE
228
PROCESSOR
218
STORAGE
222
ROM
220
SESSION INFORMATION
224
RAM
216
VOICEMAIL

FIG. 2

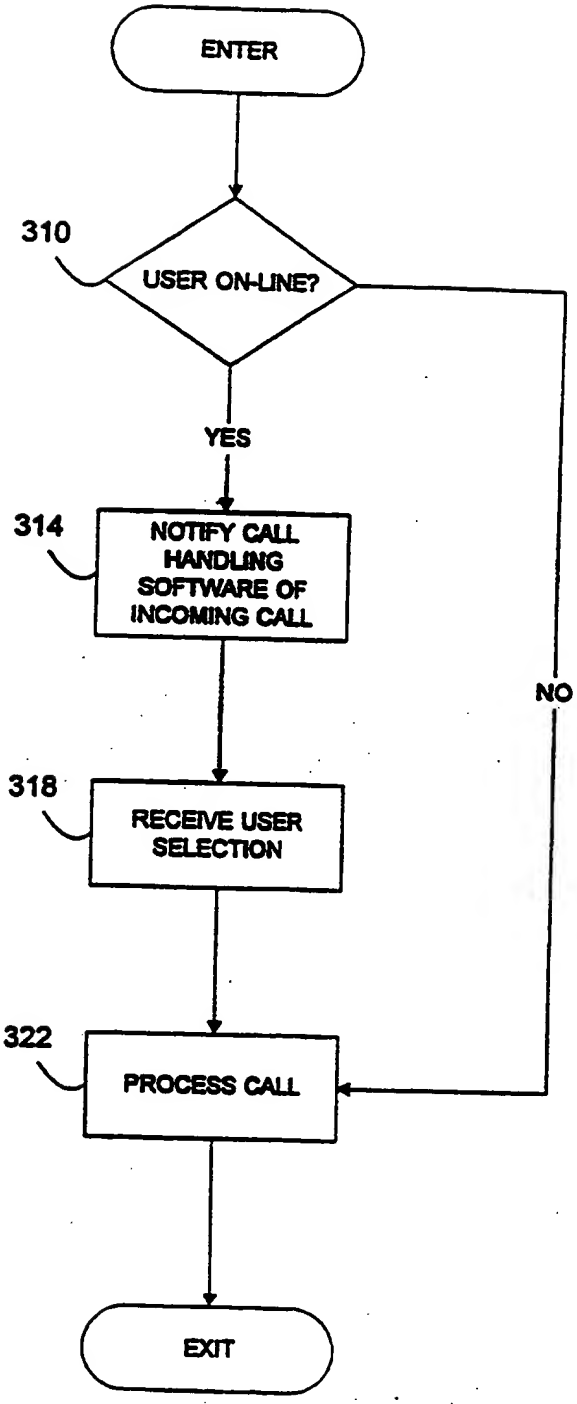
ENTER
310
USER ON-LINE?
YES
NO
314
NOTIFY CALL HANDLING SOFTWARE OF INCOMING CALL
318
RECEIVE USER SELECTION
322
PROCESS CALL
EXIT

FIG. 3

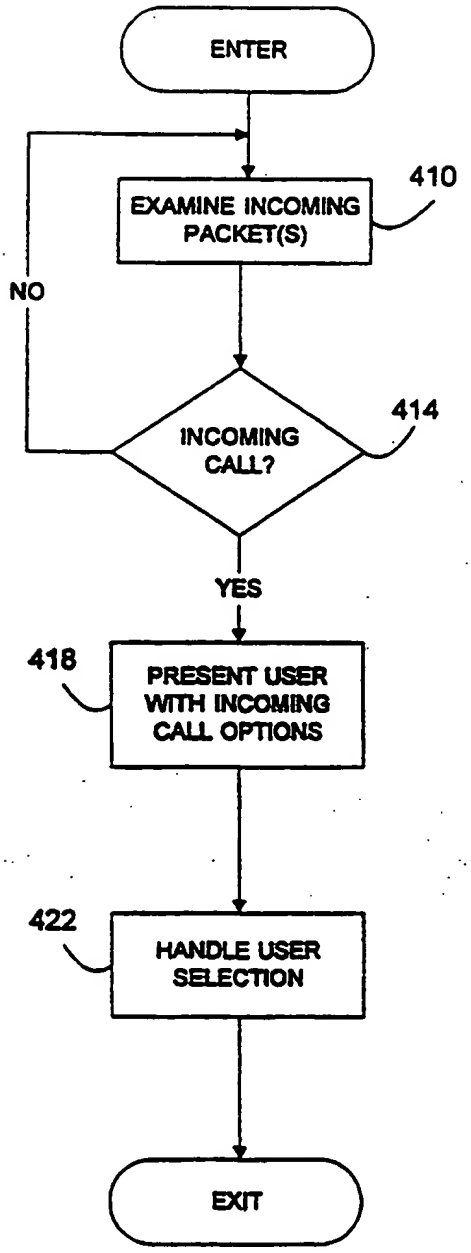
ENTER
EXAMINE INCOMING PACKET(S)
410
NO
INCOMING CALL?
414
YES
418
PRESENT USER WITH INCOMING CALL OPTIONS
422
HANDLE USER SELECTION
EXIT

FIG. 4

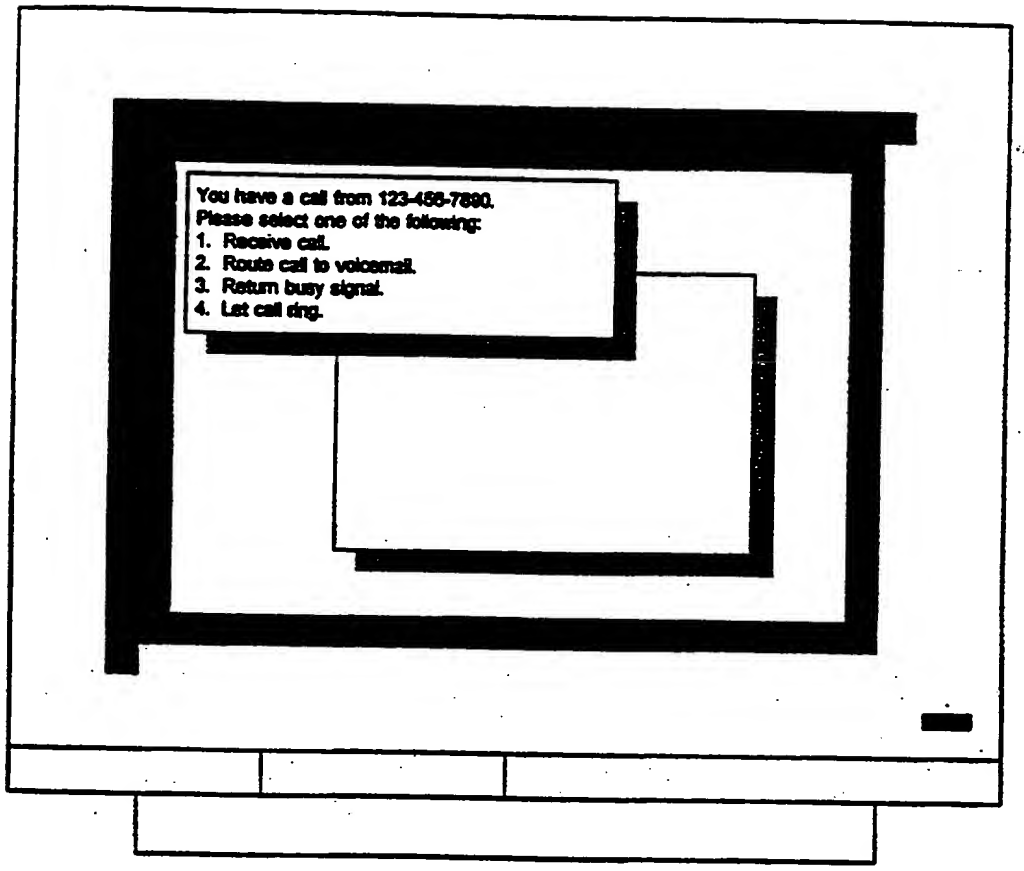
You have a call from 123-456-7890.
Please select one of the following:
1. Receive call.
2. Route call to voicemail.
3. Return busy signal.
4. Let call ring.

FIG. 5

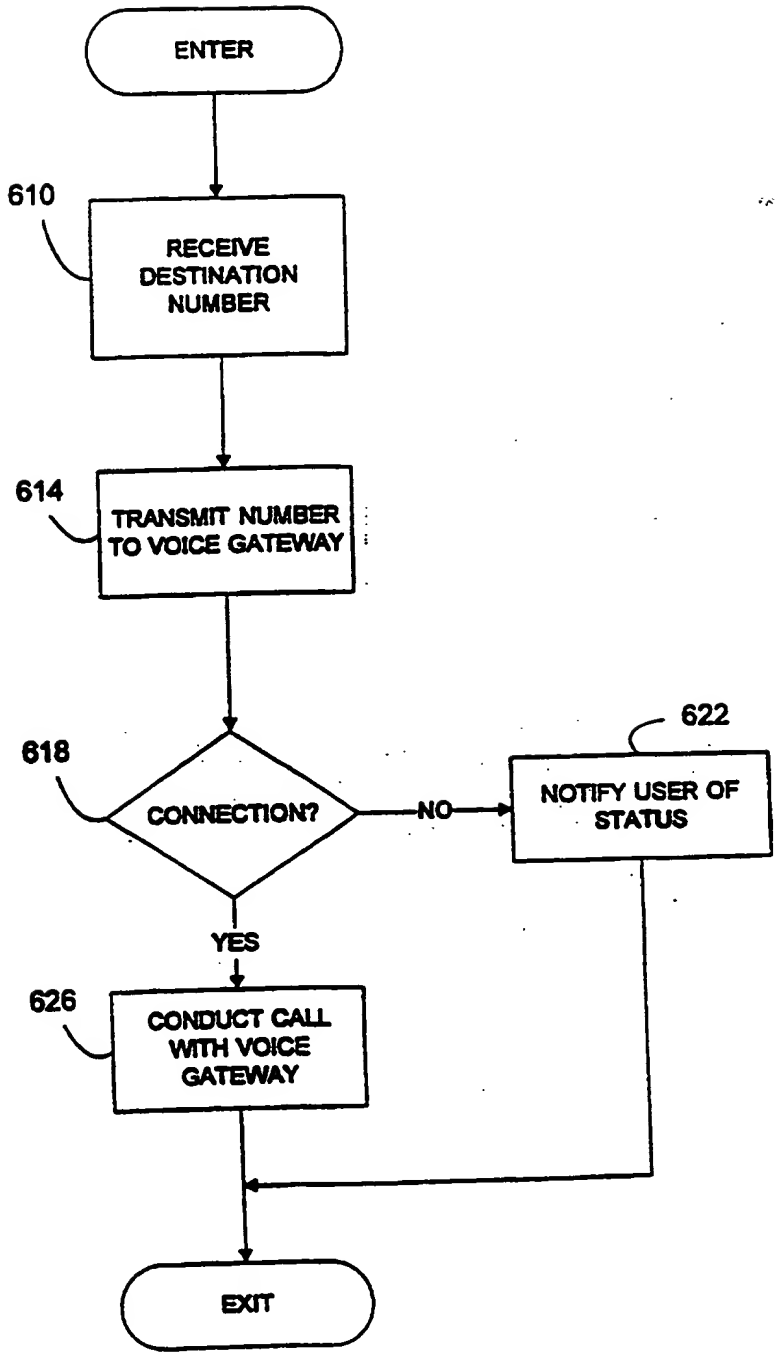
ENTER
610
RECEIVE DESTINATION NUMBER
614
TRANSMIT NUMBER TO VOICE GATEWAY
618
CONNECTION?
NO
622
NOTIFY USER OF STATUS
YES
626
CONDUCT CALL WITH VOICE GATEWAY
EXIT

FIG. 6

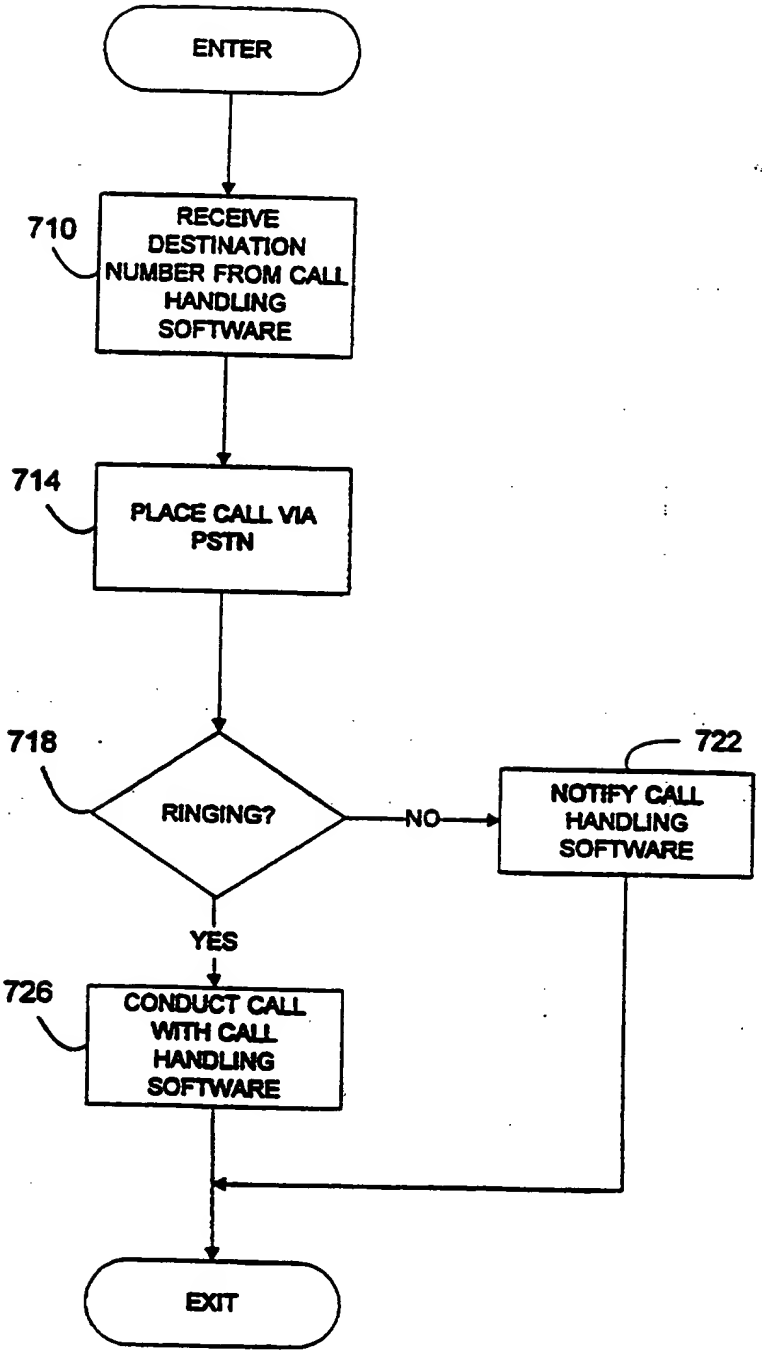
ENTER
710
RECEIVE DESTINATION NUMBER FROM CALL HANDLING SOFTWARE
714
PLACE CALL VIA PSTN
718
RINGING?
NO
722
NOTIFY CALL HANDLING SOFTWARE
YES
726
CONDUCT CALL WITH CALL HANDLING SOFTWARE
EXIT

FIG. 7

INTERNATIONAL SEARCH REPORT

Inte...dional Application No
PCT/CA 98/00200

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04M3/42 H04M7/00 H04L29/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H04M H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	RABBAGE R ET AL: "INTERNET PHONE-CHANGING THE TELEPHONY PARADIGM?" BT TECHNOLOGY JOURNAL, vol. 15, no. 2, April 1997, pages 145-157, XP000676853 see the whole document	1-20
X	LOW C: "THE INTERNET TELEPHONY RED HERRING" HP LABORATORIES TECHNICAL REPORT, 15 May 1996, pages 1-15, XP002043901 see the whole document	1-20
A	US 5 533 110 A (PINARD DEBORAH L ET AL) 2 July 1996 see the whole document	1-20

-/--

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of theinternational search	Date of mailing of the international search report
15 June 1998	22/06/1998

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Megalou, M

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INTERNATIONAL SEARCH REPORT

Inta. ..ional Application No
PCT/CA 98/00200

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
A	WO 96 05684 A (QUANTUM SYSTEMS INC) 22 February 1996 see page 27, line 18 - page 31, line 3	1-20
P,X	WO 98 01985 A (BALE MELVYN CHRISTOPHER ;HARTLEY IAN (GB); BRITISH TELECOMM (GB)) 15 January 1998 see the whole document	1-20
P,X	WO 97 37483 A (AT & T CORP) 9 October 1997 see the whole document	1-20
P,X	WO 97 26749 A (INTERACTIVE TELECOM INC) 24 July 1997 see page 5, line 1 - page 7, line 8 see page 18, line 1 - page 20, line 12 see figure 2	1-20
P,X	WO 97 20424 A (AT & T CORP) 5 June 1997 see the whole document	1-8, 14-20

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INTERNATIONAL SEARCH REPORT

Information on patent family members

Inte. ..ional Application No
PCT/CA 98/00200

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